# Creating and Demonstrating Incentives for Electricity Providers to Integrate Distributed Energy Resources

## An Abstract of the Project (August 25, 2006)

### Introduction

Distributed energy resources (DER) interconnected with utility wires on the customer side of the retail revenue meter will reduce power purchases from the utility. While the reduction of power flow through the revenue meter will generally reduce the electric utility operating costs (no need to generate and deliver that power), the reduction in costs is less than the reduction in revenues; there will generally be a net loss of income to the utility. For this reason, and others including lack of control of the resource, questions of resource reliability and impact on and value to the grid, utilities will usually have disincentives to embrace DER connected on the customer side of the meter. This has commonly been found to be true for a wide range of DER applications such as distributed generation (DG) including combined heat and power (CHP), waste gas-fueled generation (digester gas, landfill gas, flare gas), solar photovoltaics, small wind-powered generators, and end-use energy efficiency.

On the other hand, the utility may realize "system benefits" when DER is in service at customer sites. These benefits might include deferred expenditures on T&D infrastructure supporting the geography in which the DER is located, deferred expenditures for local voltage support, ISO or power pool capacity benefits and standby/spinning reserve benefits. The DER may also provide operating benefits (in terms of avoided overload outages or undervoltage events) if the utility can dispatch it when it might otherwise not be in service.

There may also be a determination as a matter of local, state, or federal public policy that certain types of DER may be in the public interest. Common public policy objectives (constrained by acceptable economic considerations) might include:

- Maximizing the use of combined cooling, heating and power installations to encourage efficient use of commercial fuels.
- Maximizing the use of off-specification fuels normally wasted or flared.
- Maximizing the use of renewable power generation technologies.
- Minimizing the need for construction of new peaking or base load power plants or T&D infrastructure.
- Provide for increased power supply assurance and power quality.
- Maximizing deployment of high efficiency end-use technologies.

The wide-scale use of DER on the customer side of the revenue meter will result in significant challenges to the ways in which regulated utilities recover their costs. New rate and utility business structures will be required to, at a minimum, remove the disincentives which utilities experience when they encounter customer-sited DER, and, hopefully, provide incentives for

utilities to encourage investment in DER to achieve system benefits and widely accepted public policy objectives.

## Project Objectives

It is the objective of this project to identify one or more "solution sets" that incorporate the interests of utility shareholders, ratepayers (represented by state public utility commissions), and DG owner/operators/developers in a fashion such that, at a minimum, none are economically penalized, and, hopefully, all realize increased benefits. Solution sets will consist of regulatory and utility business models that lead to win-win outcomes.

Once identified, this project will seek to implement, on a trial/pilot basis, suitable solution set(s), respectively, in both California and Massachusetts.

## Working Assumptions

The approach that this project takes has several working assumptions. These assumptions are used to limit the scope of the project to the challenges identified above and are not meant to represent the state of all distributed energy resources discussions.

1. On-site DER connected on the customer side of a revenue meter, i.e. the business structure is controlled by published rates and/or contracts. There may be other business structures in place for generation connected to the utility side of the revenue meter. If utility-owned, the generating asset usually is treated as any other utility investment. If IPP-owned, a power purchase agreement is negotiated with the utility. This project may explore legal and regulatory issues in order to make these structures feasible within one or more markets.

2. In order to identify whether there is "stable market" Solution Set based on large scale penetration of DER, the long-term steady state assumption is that ~10% of kWh managed and/or delivered through a utility's grid to customers comes from DER-related electricity. (The exact level of penetration is not as important as the fact that there is sufficient penetration to treat DER as an aggregated factor for a utility.) The main purpose of this assumption is to see if there is an end state that is acceptable to all parties involved. In this "stable market", there are likely to be only modest operating subsidies and revenue exchanges are assumed to be based on published rates or negotiated contracts.

3. When a "stable market" has been identified, one or more "transient" Solution Sets to get to this state of affairs will be identified. Temporary subsidies that might hasten the movement from the status quo to the "stable market" DER penetration will be recommended. (This concept has been called a "soft start" by Joe Iannucci and others.)

4. Development of the candidate supply side "stable market" and "transient" Solution Sets will draw heavily on comparable demand side activities being undertaken in various locations for energy efficiency and demand reduction.

## Project Approach

The project is based on a collaborative approach to identifying innovative business and regulatory structures. Stakeholders include electric utility staff, state public utility commission staff, state energy agency staff, DER project developers, and DER equipment manufacturers. These stakeholders will collaborate to guide the more detailed work of EPRI and EPRI contractors who will develop candidate business and regulatory Solution Sets.

Each solution set will propose utility-customer business structures and regulatory structures. They will also include an economic analysis of the impact of the Solution Set on utility shareholders, ratepayers and DER owner/operators. Emphasis will be placed on the following application classes:

- Combined cooling, heating, and power
- Waste gas-fueled generation (landfill gas, digester gas, flare gas, etc.)
- Solar photovoltaics, small wind energy, other small renewable generation
- Standby generators dispatched during peak demand periods

Consensus selection of solution sets to implement in the Pilot Program phase of the project will be undertaken by collaborators. Pilot Program details will be developed by EPRI and EPRI contractors in collaboration with utilities and regulators in the respective states.

## Schedule Milestones

- Initial Stakeholders Workshop, Massachusetts **September 2006**
  - Presentation of candidate solution sets and analysis tools
  - Identification of solution set characteristics requiring further development
- Follow-up Stakeholders Workshop, California **January 2007**
  - Review of updated candidate solution sets and analysis tools
  - Selection of solution set(s) to customize to Massachusetts and California, respectively.
- Finalize respective Pilot Plans **March 2007 (tentative)**
- Implement/Assess Pilot Plans **April-December 2007 (tentative)**
- Final Reporting **2008**

## Deliverable Summary

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| Task 1 | EPRI Technical Update report recommending alternative business models and regulator templates and documenting the process that produced the recommendations. | Draft January 2007 |
| Task 2 | Informal report on business models and regulatory templates customized for Massachusetts and California | March 2007 (tentative) |
| Task 3 | EPRI Final Project Report including effectiveness of pilot approaches implemented. | Mid 2008 (tentative) |
| Task 4 | Outreach presentation on project plan and results. | September 2007 (tentative) |

## General Information

### *Funders:*

- California Energy Commission
- State Technologies Advancement Collaborative (STAC) Award by Department of Energy/National Association of State Energy Officials, funding via Massachusetts Division of Energy Resources
- Massachusetts Technology Collaborative
- New Jersey Board of Public Utilities (pending)

### *In-kind Co-funders:*

- EnerNOC
- Massachusetts Technology Collaborative
- Massachusetts Department of Telecommunications and Energy
- National Grid
- New Jersey Board of Public Utilities
- Pacific Gas & Electric
- Northern Power
- Real Energy
- San Diego Gas and Electric
- Solar Turbines
- Southern California Edison
- Tennessee Valley Authority
- UTC Power

### *Other Stakeholders*

- Environmental Protection Agency
- First Energy
- New York State Energy Research and Development Authority

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